IN THE CLAIMS:

Please amend the claims as follows:

1. (Currently amended) A calibrating method for a heat treatment apparatus that includes a processing vessel for accommodating ~~a process object~~ process objects therein, a plurality of heaters and a plurality of temperature sensors; that stores a thermal model for estimating temperature of the process ~~object~~ objects in the processing vessel based on outputs of the temperature sensors; that estimates the temperature of the process ~~object~~ objects in the processing vessel based on the outputs of the temperature sensors by using the thermal model; and that controls the heaters based on the estimated temperature, to perform a heat treatment to the process ~~object~~ objects, said method comprising the steps of:

driving the heaters to heat an interior of the processing vessel;

measuring temperature in the processing vessel; and

calibrating the thermal model so that an estimated value of the temperature substantially ~~coincide~~ coincides with the actual measurement value of the temperature, upon comparison of the measured temperature in the processing vessel with temperature of the process ~~object~~ objects estimated by using the thermal model,

wherein:

the thermal model has a function of estimating temperature of one of the heaters and temperatures of the temperature sensors; and

the calibrating step includes the steps of:

determining a relationship between an amount of change in the temperature of said one of the heaters and amounts of change in the measured temperatures of the temperature sensors;

determining a difference between an estimated temperature of one of the temperature sensors located closest to the said one of the heaters, as estimated by using the thermal model, and an actual temperature of said one of the temperature sensors measured by the same; and

calculating a correction value based on the relationship and the difference wherein the correction value is to be applied to the temperature model such that the estimated temperature of the said one of the heaters, as estimated by the thermal model, is corrected by using the

correction value.

2-5. (Canceled)

6. (Currently amended) ~~The calibrating method for the heat treatment apparatus according to claim 3, wherein:~~ A calibrating method for a heat treatment apparatus that includes a processing vessel for accommodating process objects therein, a plurality of heaters and a plurality of temperature sensors; that stores a thermal model for estimating temperature of the process objects in the processing vessel based on outputs of the temperature sensors; that estimates the temperature of the process objects in the processing vessel based on the outputs of the temperature sensors by using the thermal model; and that controls the heaters based on the estimated temperature, to perform a heat treatment to the process objects, said method comprising the steps of:

driving the heaters to heat an interior of the processing vessel;

measuring temperature in the processing vessel; and

calibrating the thermal model so that an estimated value of the temperature substantially coincides with the actual measurement value of the temperature, upon comparison of the measured temperature in the processing vessel with temperature of the process objects estimated by using the thermal model,

wherein:

the plurality of heaters include an inside heater ~~is~~ arranged in the processing vessel;

the thermal model has a function of estimating temperature of the inside heater; and

the calibrating step ~~calculates a correction value based on a relationship between an amount of change in the temperature of the inside heater and an amount of change in the measured temperature of each of the temperature sensors, and also based on a difference between the temperature of one of the temperature sensors located closest to the inside heater estimated by using the thermal model and that actually measured, and calibrates the thermal model so that a estimated value is corrected based on the correction value~~ includes the steps of

determining a relationship between an amount of change in the temperature of the inside

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heater and amounts of change in the measured temperatures of the temperature sensors;

determining a difference between an estimated temperature of one of the temperature sensors located closest to the inside heater, as estimated by using the thermal model, and an actual temperature of said one of the temperature sensors measured by the same; and

calculating a correction value based on the relationship and the difference, wherein the correction value is to be applied to the temperature model such that the estimated temperature of the inside heater, as estimated by the thermal model, is corrected by using the correction value.

7. (Currently amended) ~~The calibrating method for the heat treatment apparatus according to claim 3, wherein:~~ A calibrating method for a heat treatment apparatus that includes a processing vessel for accommodating process objects therein, a plurality of heaters and a plurality of temperature sensors; that stores a thermal model for estimating temperature of the process objects in the processing vessel based on outputs of the temperature sensors; that estimates the temperature of the process objects in the processing vessel based on the outputs of the temperature sensors by using the thermal model; and that controls the heaters based on the estimated temperature, to perform a heat treatment to the process objects, said method comprising the steps of:

driving the heaters to heat an interior of the processing vessel;

measuring temperature in the processing vessel; and

calibrating the thermal model so that an estimated value of the temperature substantially coincides with the actual measurement value of the temperature, upon comparison of the measured temperature in the processing vessel with temperature of the process objects estimated by using the thermal model,

wherein:

the plurality of heaters includes first and second heaters ~~are~~ arranged above and below the process object in the processing vessel, respectively;

the thermal model has a function of estimating temperatures of the first and second heaters; and

the calibrating step ~~calculates a first correction value based on a relationship between an~~

~~amount of change in the temperature of the first heater and an amount of change in the measured temperature of each of the temperature sensors, and also based on a difference between the temperature of one of the temperature sensors located closest to the first heater estimated by using the thermal model and that actually measured; and calculates a second correction value based on a relationship between an amount of change in the temperature of the second heater and an amount of change in the measured temperature of each of the temperature sensors, and also based on a difference between the temperature of one of the temperature sensors located closest to the second heater estimated by using the thermal model and that actually measured; and calibrates the thermal model so that a estimated value is corrected based on the first and second correction values~~ includes the steps of:

determining relationship between an amount of change in the temperature of the first heater and amounts of change in the measured temperatures of the temperature sensors;

determining a difference between an estimated temperature of one of the temperature sensors located closest to the first heater, as estimated by using the thermal model, and an actual temperature of the temperature sensor closest to the first heater as measured by the temperature sensors located closest to the first heater;

calculating a first correction value based on the relationship and the difference, wherein the first correction value is to be applied to the temperature model such that the estimated temperature of the first heater, as estimated by the thermal model, is corrected by using the first correction value;

determining a relationship between an amount of change in the temperature of the second heater and amounts of change in the measured temperatures of the temperature sensors;

determining a difference between an estimated temperature of one of the temperature sensors located closest to the second heater, as estimated by using the thermal model, and an actual temperature of the temperature sensor closest to the second temperature sensor measured by the temperature sensor closest to the second temperature sensor; and

calculating a second correction value based on the relationship and the difference, wherein the second correction value is to be applied to the temperature model such that the estimated temperature of the second heater, as estimated by the thermal model, is corrected by

using the second correction value.

8. (Canceled)

9. (Currently amended) A heat treatment apparatus ~~that includes~~ comprising:

a processing vessel for accommodating ~~a process object~~ process objects therein, a plurality of heaters and a plurality of temperature sensors; and

a controller that stores a thermal model for estimating temperature of the process ~~object~~ objects in the processing vessel based on outputs of the temperature sensors; that estimates the temperature of the process ~~object~~ objects in the processing vessel based on the outputs of the temperature sensors by using the thermal model; and that controls the heaters based on the estimated temperature, to perform a heat treatment to the process ~~object~~ objects, ~~said apparatus comprising~~ the controller including:

means for driving the heaters to heat an interior of the processing vessel;

means for measuring temperatures of the process ~~object~~ objects in the processing vessel; and

means for calibrating the thermal model so that an estimated value of the temperature substantially ~~coincide~~ coincides with the actual measurement value of the temperature, upon comparison of the measured temperature in the processing vessel with temperature of the process ~~object~~ objects estimated by using the thermal model,

wherein:

the thermal model has a function of estimating temperature of one of the heaters and temperature of the temperature sensors; and

the calibrating means is configured:

to determine a relationship between an amount of change in the temperature of said one of the heaters and amounts of change in the measured temperatures of the temperature sensors;

to determine a difference between an estimated temperature of one of the temperature sensors located closest to the said one of the heaters, as estimated by using the thermal model, and an actual temperature of the said one of the temperature sensors measured by the same; and

to calculate a correction value based on the relationship and the difference wherein the correction value is to be applied to the temperature model such that the estimated temperature of the said one heater, as estimated by the thermal model, is corrected by using the correction value.

10-20. (Canceled)

21. (New) A heat treatment apparatus comprising:

a processing vessel for accommodating process objects therein, a plurality of heaters and a plurality of temperature sensors; and

a controller that stores a thermal model for estimating temperature of the process objects in the processing vessel based on outputs of the temperature sensors; that estimates the temperature of the process objects in the processing vessel based on the outputs of the temperature sensors by using the thermal model; and that controls the heaters based on the estimated temperature, to perform a heat treatment to the process objects, the controller including:

means for driving the heaters to heat an interior of the processing vessel;

means for measuring temperatures of the process objects in the processing vessel; and

means for calibrating the thermal model so that an estimated value of the temperature substantially coincides with the actual measurement value of the temperature, upon comparison of the measured temperature in the processing vessel with temperature of the process objects estimated by using the thermal model,

wherein:

the plurality of heaters includes an inside heater arranged in the processing vessel;

the thermal model has a function of estimating temperature of the inside heater and temperatures of the temperature sensors; and

the calibrating means is configured:

to determine a relationship between an amount of change in the temperature of the inside heater and amounts of change in the measured temperatures of the temperature sensors;

to determine a difference between an estimated temperature of one of the temperature

sensors located closest to the inside heater, as estimated by using the thermal model, and an actual temperature of said one of the temperature sensors measured by the same; and

to calculate a correction value based on the relationship and the difference wherein the correction value is to be applied to the temperature model such that the estimated temperature of the inside heater, as estimated by the thermal model, is corrected by using the correction value.

22. (New) A heat treatment apparatus comprising:

a processing vessel for accommodating process objects therein, a plurality of heaters and a plurality of temperature sensors; and

a controller that stores a thermal model for estimating temperature of the process objects in the processing vessel based on outputs of the temperature sensors; that estimates the temperature of the process objects in the processing vessel based on the outputs of the temperature sensors by using the thermal model; and that controls the heaters based on the estimated temperature, to perform a heat treatment to the process objects, the controller including:

means for driving the heaters to heat an interior of the processing vessel;

means for measuring temperatures of the process objects in the processing vessel; and

means for calibrating the thermal model so that an estimated value of the temperature substantially coincides with the actual measurement value of the temperature, upon comparison of the measured temperature in the processing vessel with the temperature of the process objects estimated by using the thermal model,

wherein:

the plurality of heaters includes first and second heaters arranged above and below the process objects in the processing vessel, respectively;

the thermal model has a function of estimating temperatures of the first and second heaters; and

the controller is configured:

to determine a relationship between an amount of change in the temperature of the first heater and amounts of change in the measured temperatures of the temperature sensors;

to determine a difference between an estimated temperature of one of the temperature sensors located closest to the first heater, as estimated by using the thermal model, and an actual temperature of the temperature sensor closest to the first heater measured by the temperature sensor closest to the first heater;

to calculate a first correction value based on the relationship and the difference wherein the first correction value is to be applied to the temperature model such that the estimated temperature of the first heater, as estimated by the thermal model, is corrected by using the first correction value;

to determine a relationship between an amount of change in the temperature of the second heater and amounts of change in the measured temperatures of the temperature sensors;

to determine a difference between an estimated temperature of one of the temperature sensors located closest to the second heater, as estimated by using the thermal model, and an actual temperature of the temperature sensor closest to the second temperature sensor as measured by the temperature sensor closest to the second temperature sensor; and

to calculate a second correction value based on the relationship and the difference wherein the second correction value is to be applied to the temperature model such that the estimated temperature of the second heater, as estimated by the thermal model, is corrected by using the second correction value.